System Thinking, Social-Science, and Humility in Defending Against Terrorism

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Preface

- MORS working group is addressing systems approaches to critical infrastructure protection.

- But

- What's a system? What's "systems thinking?"

- And what's special about systems thinking in people-centric problems?

- Analytic paradigms and methods for drawing on the social-science literature?

Topics

- System View in Study of "Deterrence" after 9/11

- Social Science for Counterterrorism, and for Stabilization and Reconstruction

- For Discussion, Given Time

  - Other model types needed

  - Need for exploratory analysis
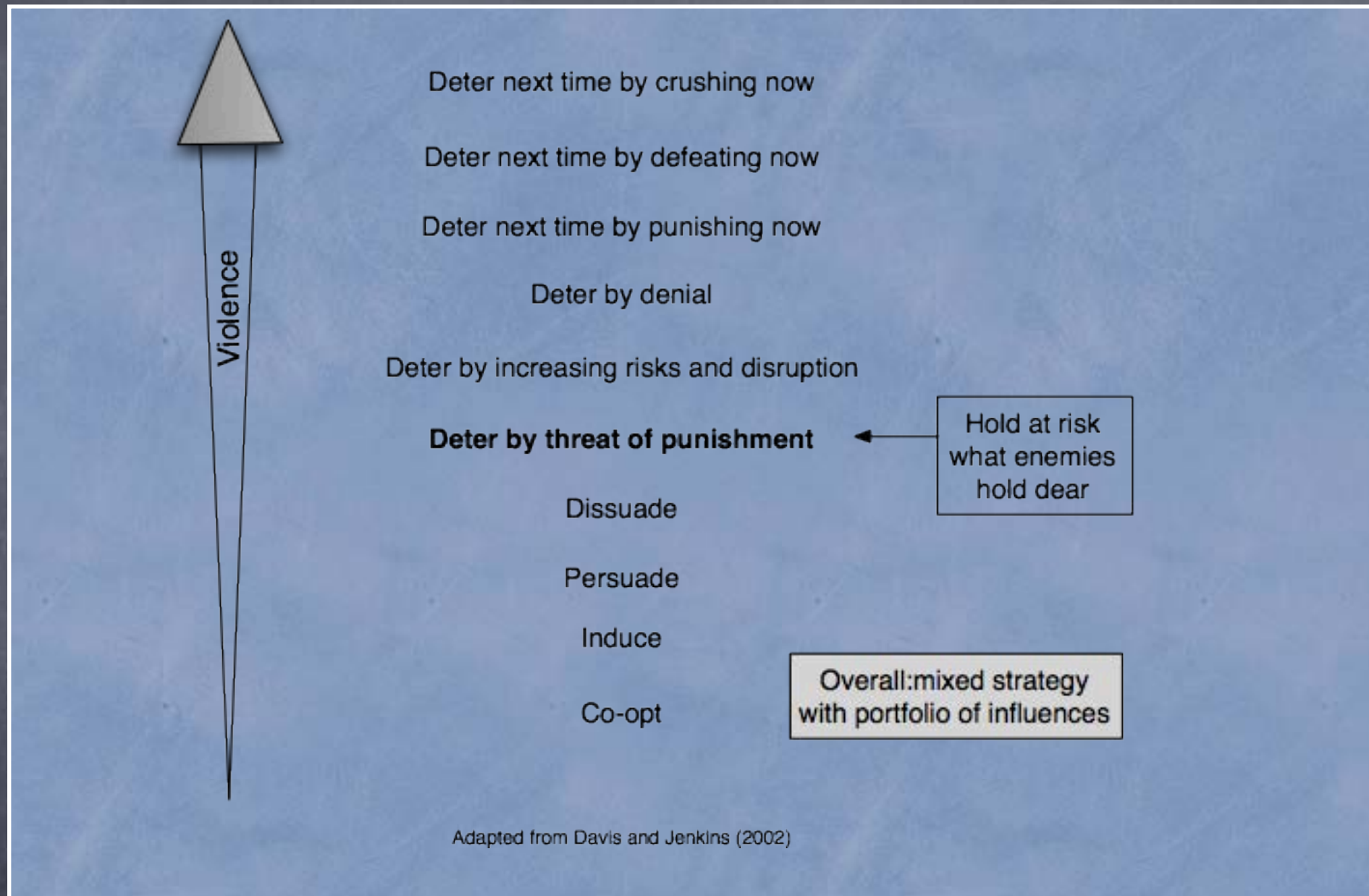
Deterrence Studies, 2002 and 2009

Background: 2002 Study on Deterrence in Counterterrorism

- Requested by Director of DARPA

  - Separate studies by National Academy and RAND/IDA

  - Motivation: deterrence's importance in cold war

- Two reports: Davis and Jenkins (2002) from RAND and Bonoan, Davis, Roberts, Utgoff, and Ziemke from IDA (2002)(FOUO)

  - Follow-up paper in 2009/2010 for scholarly conference in Zurich (RAND paper and Stanford University Press, forthcoming)
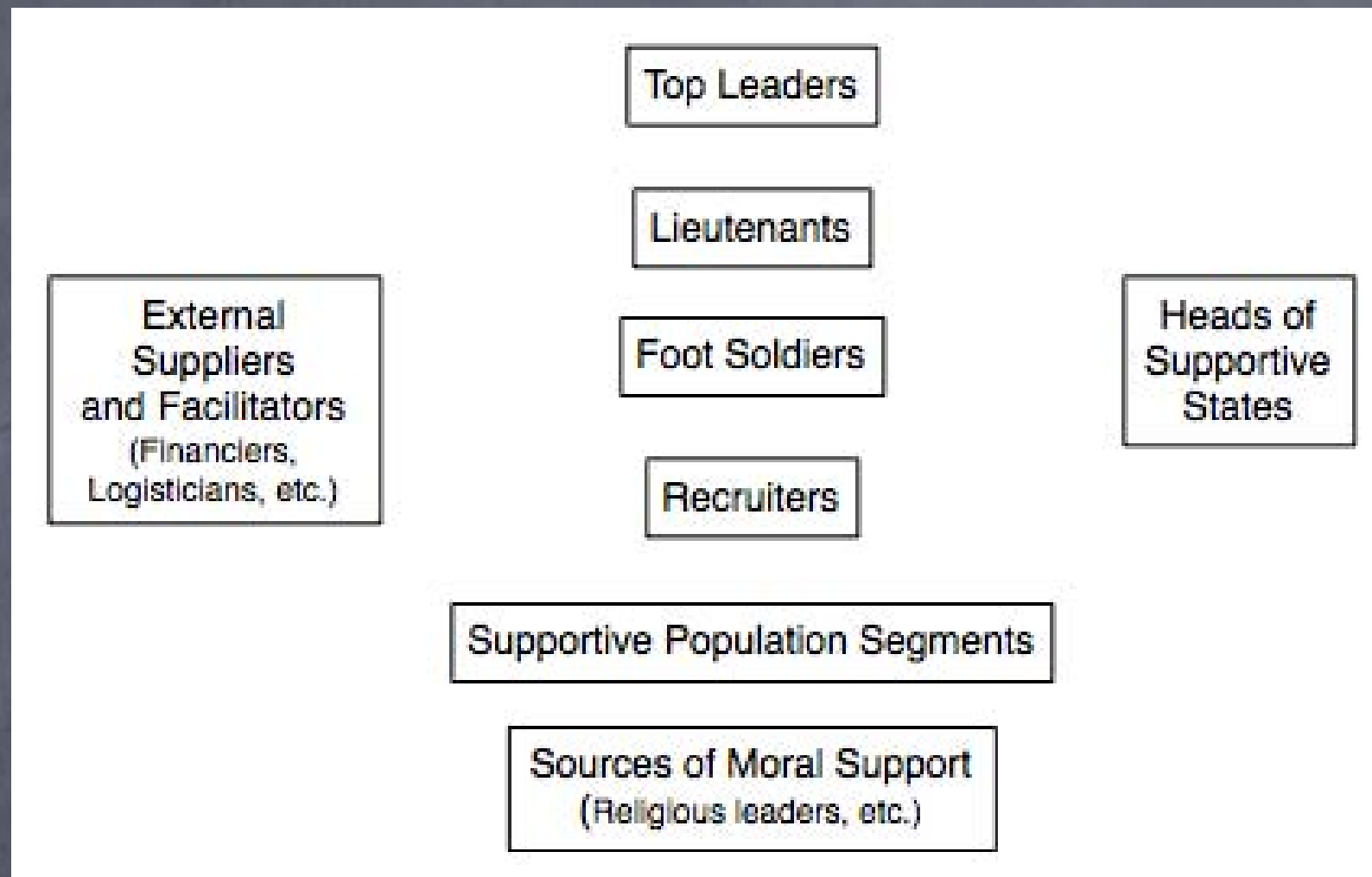
Conclusions in 2002

- Cold-war deterrence is largely irrelevant when dealing with a bin Laden

  - Classic deterrence says "If you do __, we will __ (and if you don't we won't)"

  - We're trying to destroy al-Qaeda already, and will not stop

- Besides, deterrence is too narrow as the supplement to "kinetics"

- "Influence" is better concept, increasing battle space

- Seeing al-Qaeda as a system rather than monolith changes everything

Spectrum of Influences

Deter next time by crushing now

Deter next time by defeating now

Deter next time by punishing now

Deter by denial

Deter by increasing risks and disruption

Deter by threat of punishment ← Hold at risk what enemies hold dear

Dissuade

Persuade

Induce

Co-opt

Overall:mixed strategy with portfolio of influences

Violence

Adapted from Davis and Jenkins (2002)

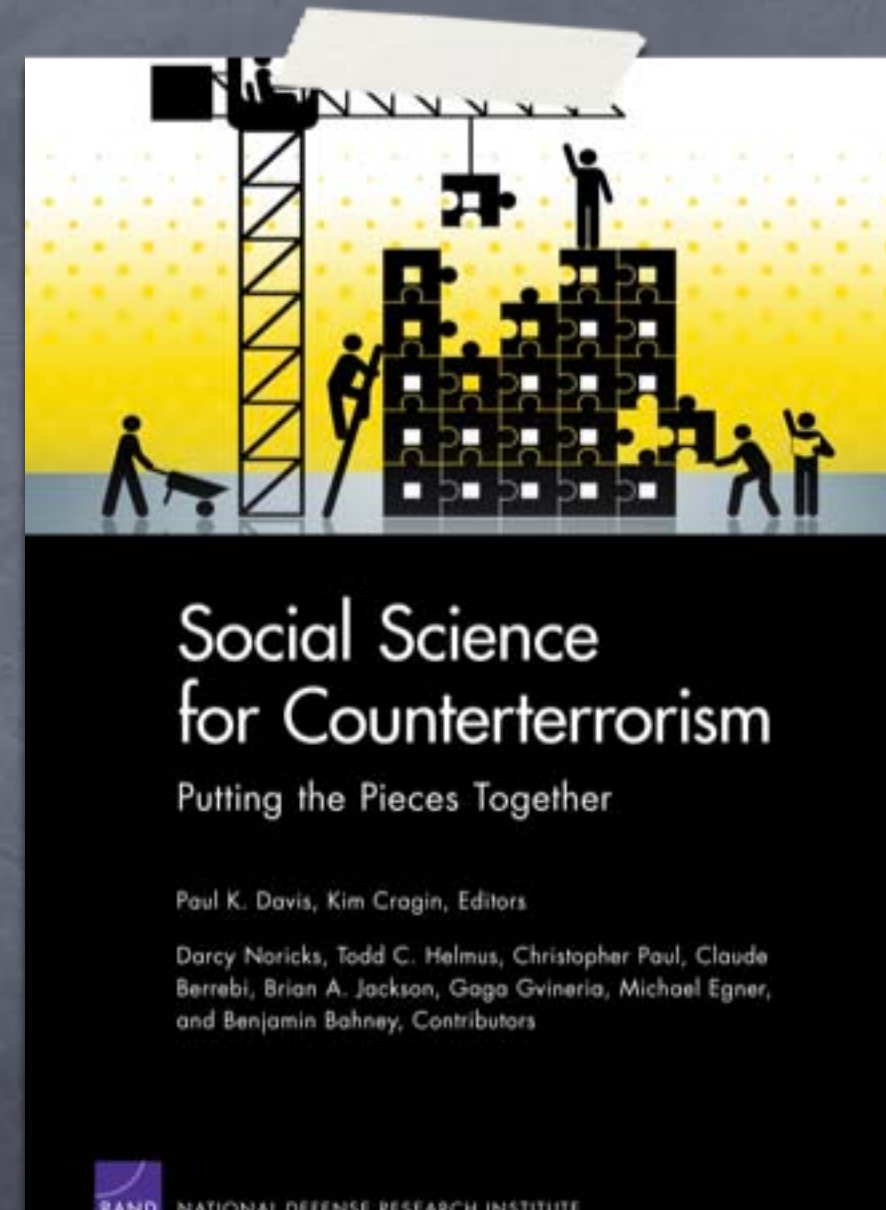# Elements of System, Each with Different Vulnerabilities

Tapping Social Science

BACKGROUND

- RAND survey of social-science literature relevant to counterterrorism, with eye on value for analysis

- Going-In admonitions:

  - Learn first; defer modeling, and certainly computer modeling

  - Go back to basics: what is social science actually telling us?

- Midpoint observations:

  - Literature is rich, but fragmented

    - Different disciplines, tribes, methods,...; disagreements

    - No common ground for communication

References (www.rand.org)

- Paul K. Davis and Kim Cragin (eds.), Social Science for Counterterrorism: Putting the Pieces Together, RAND, 2009.

- Paul K. Davis, "Specifying the Content of Humble Social-Science Models," Summer Simulation Conference, 2009; reprinted by RAND as RP-1408, 2009

- Paul K. Davis, Simple Models To Explore Deterrence and More General Influence in the War with Al-Qaeda, RAND, 2010

- Paul K. Davis and Brian Jenkins, Deterrence and Influence as a Component in the War with Al-Qaeda, RAND, 2002

- Special-access RAND reports in 2010 by Cragin, Helmus, and Jackson

Social Science for Counterterrorism

Putting the Pieces Together

Paul K. Davis, Kim Cragin, Editors

Darcy Noricks, Todd C. Helmus, Christopher Paul, Claude Berrebi, Brian A. Jackson, Gaga Gvineria, Michael Egner, and Benjamin Bahney, Contributors

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Major Challenge in Tapping Social Science: Different Paradigms

Data-Driven (Atheoretical, Empirical)	Theoretical and Theory-Informed
Factor by factor specialized	System
"Data of convenience"	Variables of actual interest
Statistical modeling	Causal modeling
Correlations	Explanations
Data-driven empirical	Theory-driven inquiry

Status:
- Both are crucial
- Need more and better data
- Need more of theory-informed approach for balance: guide empirical work and serve where data is insufficient

Relative Advantages in <u>All</u> Science

Issue	Atheoretical Empirical Work
Empirical falsification; cautions	••••
Empirical models simpler than expected by theory	••••
Predictions in absence of theory	••••
Unexpected importances	••••
Falsification from principles	
Extrapolations beyond data	••
Tightening and calibrating	
Principles and mechanisms	
Causal reasoning in policy making	

Relative Advantages in <u>All</u> Science

Issue	Atheoretical Empirical Work	Theory and Theory-Informed Empirical Work
Empirical falsification; cautions	••••	
Empirical models simpler than expected by theory	••••	
Predictions in absence of theory	••••	
Unexpected importances	••••	••
Falsification from principles		••••
Extrapolations beyond data	••	••••
Tightening and calibrating		••••
Principles and mechanisms		••••
Causal reasoning in policy making		••••

Conclusion: Key Elements of Approach Needed

- System view
- Causal modeling with
  - Qualitative variables
  - Multiresolution "factor trees" and influence diagrams
  - Graphical and tabular depictions of complex and processes
  - Random processes due to hidden variables (or unknown values)
- Interactive exploratory modeling for knowledge discovery
- Exploratory analysis amidst uncertainty

For realm of complex adaptive systems (CAS)

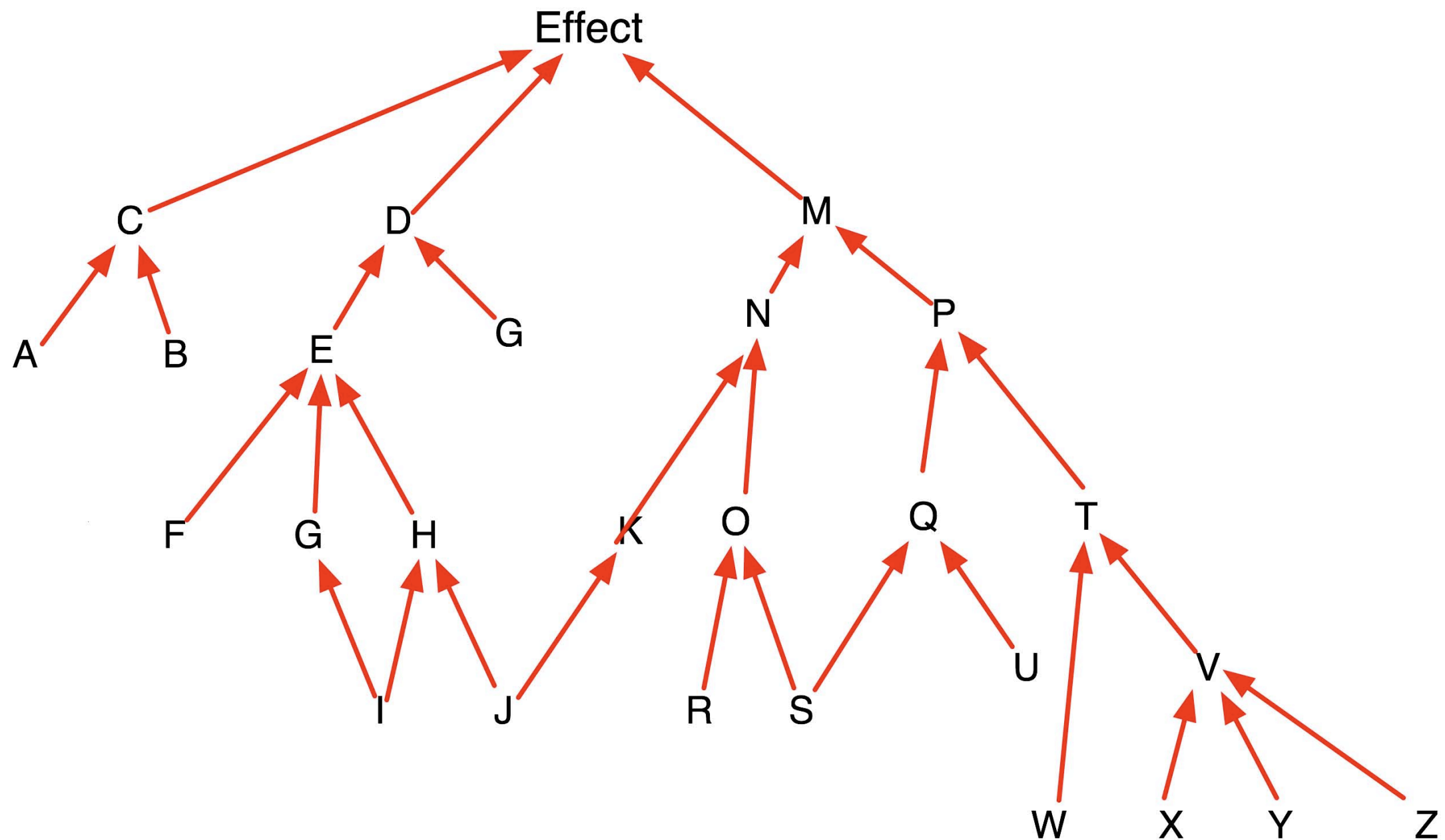# Challenge: Introducing Such Thinking Unobtrusively

- Purpose: synthesize state of knowledge objectively

- Criteria:

  - Be able to discuss complex phenomena with diverse social scientists, policy analysts, and "modelers"

  - Take "system view" in sense of seeing whole of phenomenology

  - Reflect many strands of work ("Where's my work? Ah, there it is")

- Features of Approach:

  - Humility

  - Simplicity (hide complications)

  - Starting point of abc's, but laying more ambitious path

- Aspiration

  - Structure should itself be useful to "doers:" for checklist, seeing whole, and communications

  - Obvious variant could be basis for "lines of approach"

Step One: Coherence from Cacophony

- Starting point:

- Many scholars, many journals, many perspectives, methods, and lingos

- Many people emphasizing various single-factor explanations

- Non-useful summary: "Well, the causes of terrorism are A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z"
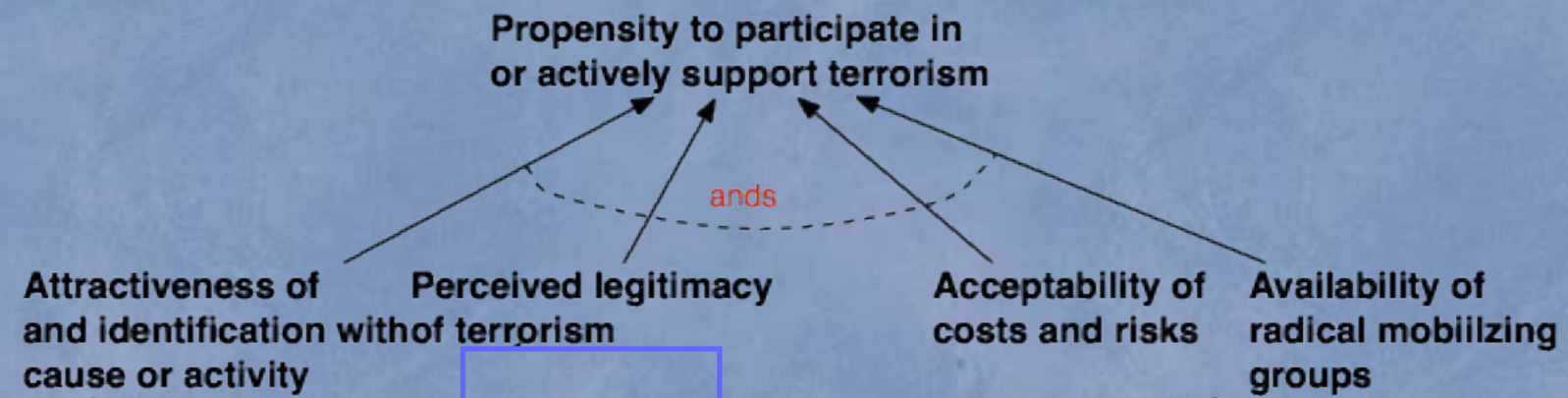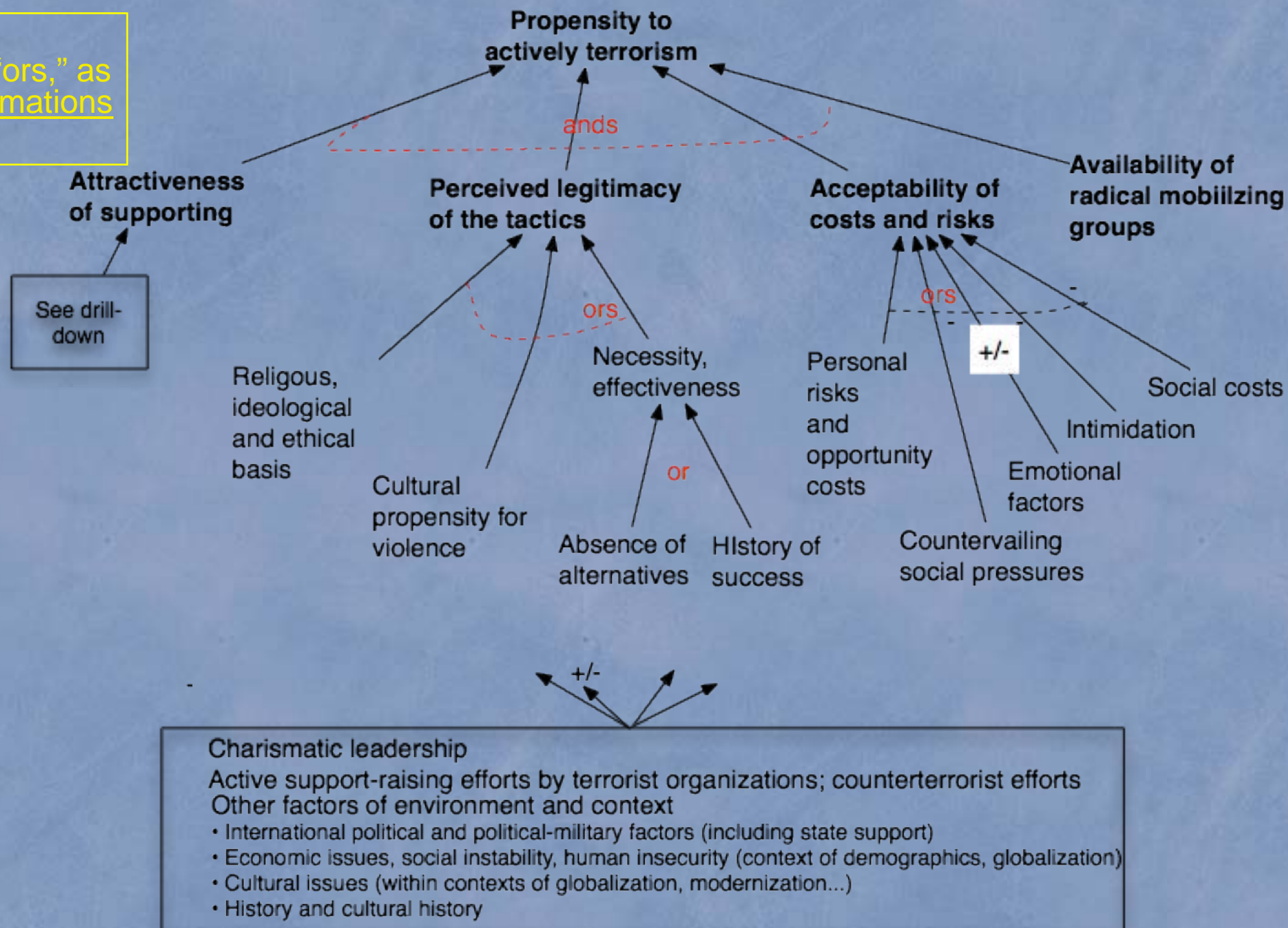
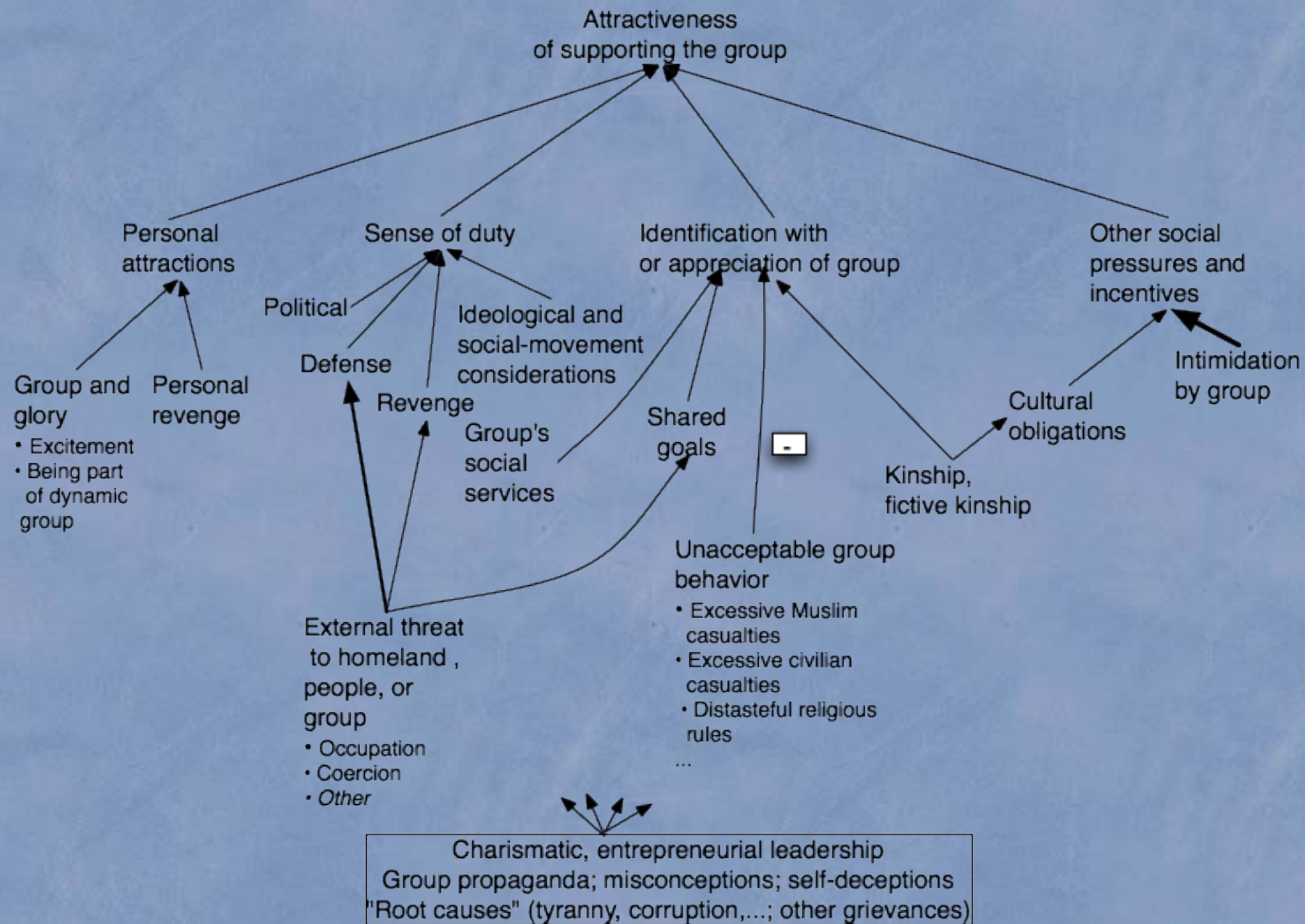# Some Examples

Illustrative Factor Tree from Terrorism Study

Factor Tree from Public Support of Terrorism (JIEDDO)

Note "ands" and "ors," as important approximations

Propensity to actively terrorism

ands

Attractiveness of supporting

See drill-down

Perceived legitimacy of the tactics

ors

Acceptability of costs and risks

Availability of radical mobiilzing groups

ors

+/-

Religous, ideological and ethical basis

Cultural propensity for violence

Necessity, effectiveness

or

Absence of alternatives   HIstory of success

Personal risks and opportunity costs

Countervailing social pressures

Emotional factors

Intimidation

Social costs

+/-

Charismatic leadership
Active support-raising efforts by terrorist organizations; counterterrorist efforts
Other factors of environment and context
• International political and political-military factors (including state support)
• Economic issues, social instability, human insecurity (context of demographics, globalization)
• Cultural issues (within contexts of globalization, modernization...)
• History and cultural history

Attractiveness of supporting the group

Personal attractions
Sense of duty
Identification with or appreciation of group
Other social pressures and incentives

Political
Defense
Revenge
Ideological and social-movement considerations
Group's social services
Shared goals
Cultural obligations
Intimidation by group

Group and glory
Personal revenge
- Excitement
- Being part of dynamic group

Kinship, fictive kinship

External threat to homeland, people, or group
- Occupation
- Coercion
- Other

Unacceptable group behavior
- Excessive Muslim casualties
- Excessive civilian casualties
- Distasteful religious rules
...

Charismatic, entrepreneurial leadership
Group propaganda; misconceptions; self-deceptions
"Root causes" (tyranny, corruption,...; other grievances)

Terrorist Decisionmaking

Propensity to act

ands

Perceived benefits

Acceptability of acts
and perceived risks

Acceptability of
resources required

Sufficiency of
information

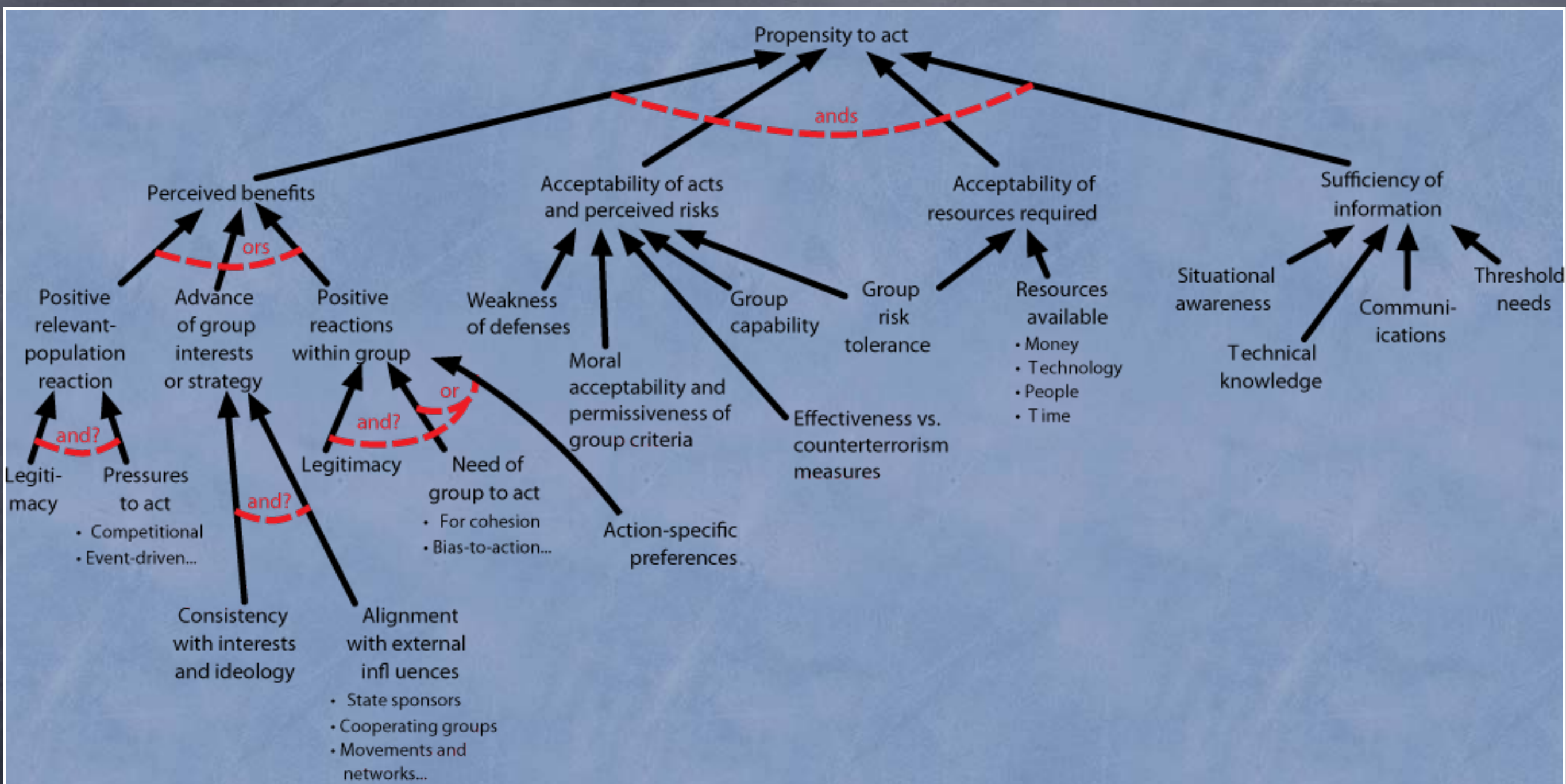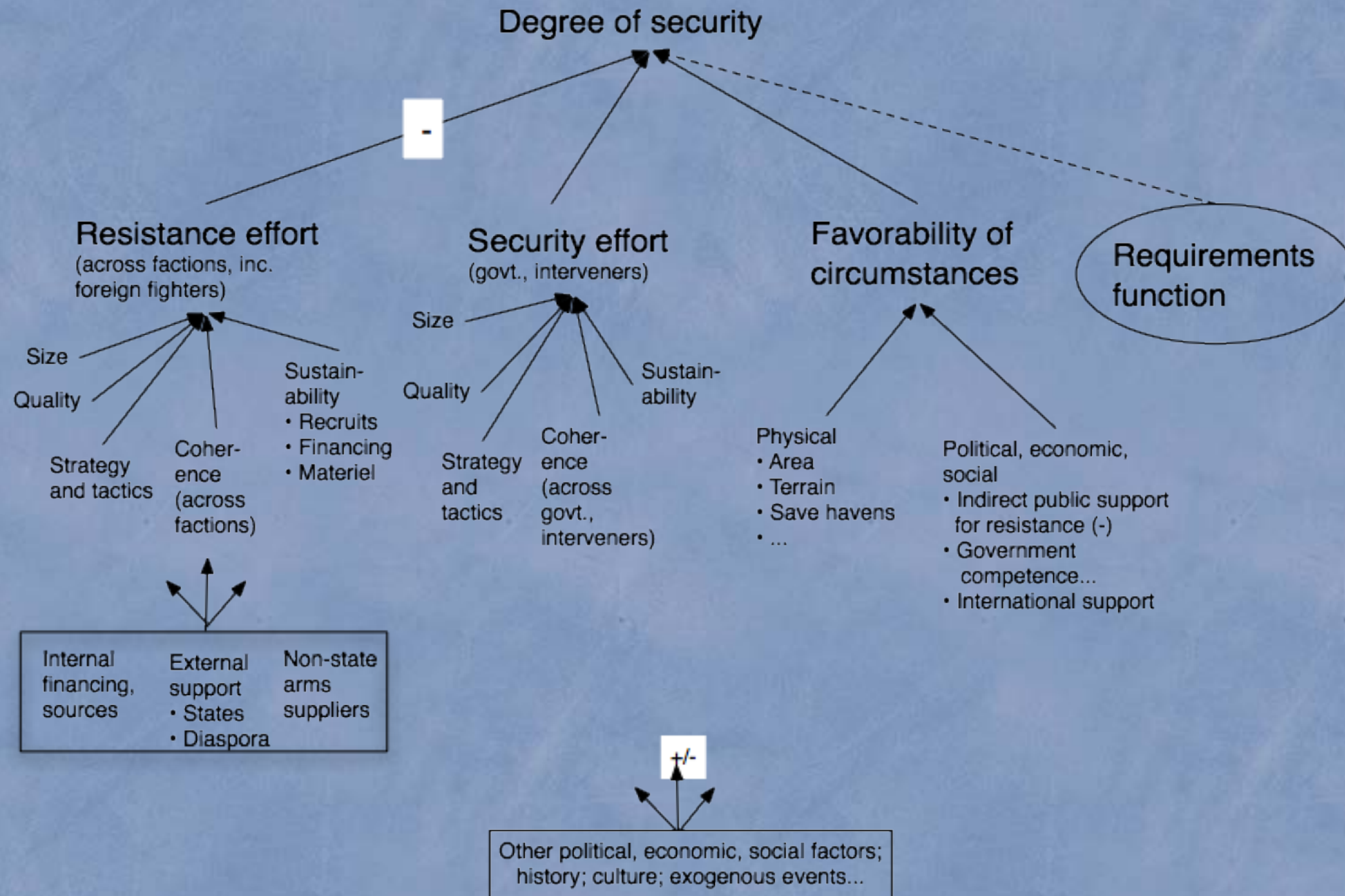SOURCE: Adapted and simplified from Jackson (2009).
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Terrorist Decisionmaking
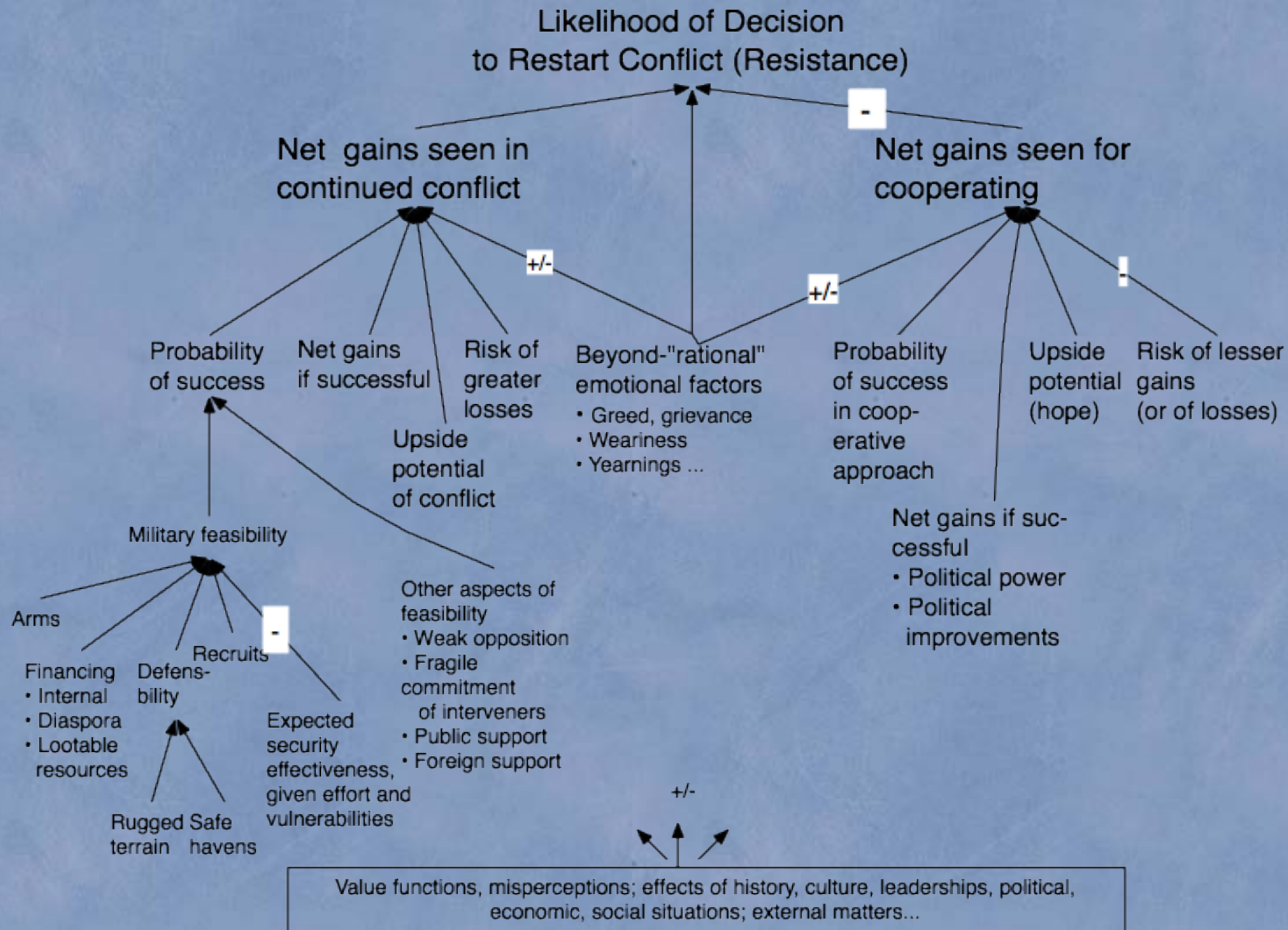

SOURCE: Adapted and simplified from Jackson (2009).

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Draft Tree from Stabilization Study: Will War Reoccur?

Backups

Other Models, Methods

- Needed

- System dynamics and other simulations

- Exploratory analysis under uncertainty

- Portfolio analysis

- Relationships?

- Causal models and quantitative social science

System View of Support for Terrorism (public support, accomplices, facilitators...)